

State of Colorado
Oil and Gas Conservation Commission

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Document Number:
403247109
Receive Date:
03/30/2023
Report taken by:
RICK ALLISON

Site Investigation and Remediation Workplan (Supplemental Form)

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. However, this shall not preclude the Operator from taking immediate action to protect public health or safety, the environment, wildlife, or livestock.

This Form 27 describes site conditions as currently understood by the Operator; approval of this Form 27 by COGCC is based on the site conditions accurately described herein; any changes in site conditions identified during or subsequent to the performance of the approved workplan may necessitate additional investigation or remediation which shall be described on a supplemental Form 27. This Form 27 is intended to provide basic information regarding the proposed site investigation and remediation actions, but the workplan may be more fully described in attached documentation.

Closure request is not available for an Initial Site Investigation and Remediation Workplan.

OPERATOR INFORMATION

Name of Operator: <u>PDC ENERGY INC</u>	Operator No: <u>69175</u>	Phone Numbers
Address: <u>1775 SHERMAN STREET - STE 3000</u>		Phone: <u>(303) 860-5800</u>
City: <u>DENVER</u> State: <u>CO</u> Zip: <u>80203</u>		Mobile: <u>()</u>
Contact Person: <u>Karen Olson</u>	Email: <u>taspillremediationcontractor@pdce.com</u>	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 21320 Initial Form 27 Document #: 402892598

PURPOSE INFORMATION

- Rule 913.c.(1): Pit or Cuttings Trench closure.
- Rule 913.c.(2): Buried or partially buried vessel closure, which will be by removal.
- Rule 913.c.(3): Remediation of Spill and Releases pursuant to Rule 912.
- Rule 913.c.(4): Land treatment of Oily Waste pursuant to Rule 905.e.
- Rule 913.c.(5): Closure of Centralized E&P Waste Management Facilities pursuant to Rule 907.h.
- Rule 913.c.(6): Remediation of impacted Groundwater pursuant to Rule 915.e.(3).D, and the contaminant concentrations in Table 915-1.
- Rule 913.c.(7): Investigation and remediation of natural gas in soil or Groundwater.
- Rule 913.c.(8): When requested by the Director due to any potential risk to soil, Groundwater, or surface water.
- Rule 913.c.(9): Decommissioning of Oil and Gas Facilities.
- Rule 913.g: Changes of Operator.
- Rule 915.b: Request to leave elevated inorganics in situ.
- Other: _____

SITE INFORMATION

No Multiple Facilities

Facility Type: <u>LOCATION</u>	Facility ID: <u>472240</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Peak 1</u>	Latitude: <u>40.443868</u>	Longitude: <u>-104.593302</u>	
	** correct Lat/Long if needed: Latitude: <u>40.443869</u>	Longitude: <u>-104.593472</u>	
QtrQtr: <u>SENW</u>	Sec: <u>31</u>	Twp: <u>6N</u>	Range: <u>64W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

SITE CONDITIONS

General soil type - USCS Classifications SM Most Sensitive Adjacent Land Use Residential / Agricultural
 Is domestic water well within 1/4 mile? Yes Is surface water within 1/4 mile? Yes
 Is groundwater less than 20 feet below ground surface? Yes

Other Potential Receptors within 1/4 mile

Nearest Well: Monitoring -1,105' SSE; Surface Water: Lone Tree Creek - 485' NE, Occupied Building: 280' SSE; Livestock: 90' E; FWS Wetlands: 485' NE Riverine (R5UBH); HPH: located within Aquatic Native Species Conservation Waters buffer along Lone Tree Creek.

SITE INVESTIGATION PLAN

TYPE OF WASTE:

- | | | |
|--|--|--|
| <input checked="" type="checkbox"/> E&P Waste | <input type="checkbox"/> Other E&P Waste | <input type="checkbox"/> Non-E&P Waste |
| <input checked="" type="checkbox"/> Produced Water | <input type="checkbox"/> Workover Fluids | |
| <input checked="" type="checkbox"/> Oil | <input type="checkbox"/> Tank Bottoms | |
| <input checked="" type="checkbox"/> Condensate | <input type="checkbox"/> Pigging Waste | |
| <input type="checkbox"/> Drilling Fluids | <input type="checkbox"/> Rig Wash | |
| <input type="checkbox"/> Drill Cuttings | <input type="checkbox"/> Spent Filters | |
| | <input type="checkbox"/> Pit Bottoms | |
| | <input type="checkbox"/> Other (as described by EPA) | |

DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	SOILS	Refer to Tables 1-5 & Figures 1-2	Confirmation Soil Sampling

INITIAL ACTION SUMMARY

Description of initial action or emergency response measures take to abate, investigate, and/or remediate impacts associated with E&P Waste.

Between March 9 and 11, 2022, field screening and confirmation soil sampling was conducted in accordance with the COGCC Rule 911 during the decommissioning and closure of the Peak 1 tank battery (Figure 1). Based on analytical results, it was determined that a historic release was discovered adjacent to and beneath the former produced water vessel (PWV). Following the discovery of the release, mitigation activities were initiated and to date, approximately 95.5 cubic yards of impacted material was removed at the PWV excavation. Additionally, approximately 2 cubic yards of impacted material was removed at the separator dump-line, and approximately 0.5 cubic yards of impacted material was removed at the meter house as part of general housekeeping decommissioning activities. All material removed was transported to the North Weld Waste Management Facility in Ault, CO for disposal under PDC waste manifests. On March 9, 2022, one soil sample (SS01 @ 10') was collected from impacted source below the PWV at approximately 10 feet bgs. The sample was submitted for laboratory analysis of the full COGCC Table 915-1 analyte suite. Analytical results indicated COCs for the historic release below the PWV include BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), anthracene, chrysene, fluorene, 1-M, 2-M, EC, and SAR.

PROPOSED SAMPLING PLAN

Proposed Soil Sampling

Will soil samples be collected as part of this investigation? (Number, type (grab/composite), analyses, and locations of samples):

Between March 9 and 11, 2022, eleven (11) soil samples (SS01-SS04, SS06, SS09-SS10, SS12-SS13, & SS15-SS16) were collected from the base and sidewalls of the excavation at depths ranging between 5 feet and 15 feet bgs and were submitted for laboratory analysis of the above referenced COCs. In addition, soil sample SS05 was unintentionally submitted for laboratory analysis of PAHs, EC, and SAR, while soil sample SS07 was submitted for laboratory analysis of BTEX, TMBs, naphthalene, and TPH (C6-C36). Additionally, one soil sample (SS11) was collected from the sidewall of the excavation at a depth of 2.5 feet bgs and was submitted for laboratory analysis of pH, EC, SAR, and Boron. Soil sample SS05 was submitted for laboratory analysis of PAHs, EC, and SAR. Analytical results indicated concentrations were below applicable COGCC Table 915-1 standards.

Proposed Groundwater Sampling

Will groundwater samples be collected as part of this investigation? (Number, analyses, and locations of samples):

Proposed Surface Water Sampling

Will surface water samples be collected as part of this investigation? (Number, analyses, and locations of samples):

Additional Investigative Actions

Additional alternative investigative actions described in attached Site Investigation Plan (summary):

Additionally, two (2) soil samples (MH01-B & MH01-E) were collected below the former meter house at 1 foot and 0.5 feet. On March 10, 2022, two soil samples (SEP01-DL-E) were collected below the former separator dump-line at 2.5 feet and 5 feet. Samples were submitted for the full COGCC Table 915-1 analytical suite. Analytical results indicated that metal concentrations were in exceedance of the applicable standards in sample MH01-B.

During initial closure activities conducted on March 9, 2022, soil encountered on-site and below production equipment was inspected and screened for volatile organic compound (VOC) concentrations using a PID. Per the approved proposed soil sampling plan, samples were collected adjacent to the above ground storage tank and separator flowline. The samples were submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, and TPH. Analytical results indicated that organic concentrations were below the COGCC Table 915-1 standards.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 20

Number of soil samples exceeding 915-1 3

Was the areal and vertical extent of soil contamination delineated? No

Approximate areal extent (square feet) 293

NA / ND

-- Highest concentration of TPH (mg/kg) 6110

-- Highest concentration of SAR 17.7

BTEX > 915-1 Yes

Vertical Extent > 915-1 (in feet) 10

Groundwater

Number of groundwater samples collected 0

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet) _____

Number of groundwater monitoring wells installed _____

Number of groundwater samples exceeding 915-1 _____

_____ Highest concentration of Benzene (µg/l) _____

_____ Highest concentration of Toluene (µg/l) _____

_____ Highest concentration of Ethylbenzene (µg/l) _____

_____ Highest concentration of Xylene (µg/l) _____

_____ Highest concentration of Methane (mg/l) _____

Surface Water

0 Number of surface water samples collected

_____ Number of surface water samples exceeding 915-1

If surface water is impacted, other agency notification may be required.

OTHER INVESTIGATION INFORMATION

Were impacts to adjacent property or offsite impacts identified?

Were background samples collected as part of this site investigation?

On March 10, 2022, five (5) background soil samples (BKG01) were collected at approximately 1 foot, 2.5 feet, 4 feet, 5 feet, and 10 feet, bgs from native material adjacent to the tank battery. All background soil samples were submitted for analysis of the COGCC Table 915-1 metals. Analytical results indicated that arsenic, barium, and selenium were in exceedance of the applicable regulatory standards in native soil adjacent to the tank battery.

Additionally, on November 16, 2022, twenty (20) background soil samples were collected from four soil borings (BKG02-BKG05) between depths of 1 foot and 10 feet, bgs from native material adjacent to the tank battery. All background soil samples were submitted for analysis of the COGCC Table 915-1 metals. Analytical results indicated that arsenic, barium, and selenium were in exceedance of the applicable regulatory standards in native soil adjacent to the tank battery.

Was investigation derived waste (IDW) generated as part of this investigation?

Volume of solid waste (cubic yards) 98

Volume of liquid waste (barrels) 0

Is further site investigation required?

Per correspondence with the COGCC Environmental Protection Specialist, up to three (3) additional background soil borings will be advanced to approximately 10 feet bgs. The background soil borings will be advanced adjacent to the former tank battery to evaluate selenium concentrations in native material. The proposed background soil boring locations are illustrated on Figure 3.

REMEDIAL ACTION PLAN

Does this Supplemental Form 27A include changes to a previously approved Remedial Action Plan? No

SOURCE REMOVAL SUMMARY

Describe how source is to be removed.

Between March 9 and 11, 2022, approximately 98 cubic yards of impacted material were excavated below and adjacent to the former PWV, meter house, and separator dump-line and was transported to the North Weld Waste Management Facility for disposal under PDC waste manifests.

REMEDIATION SUMMARY

Describe how remediation of existing impacts to soil and groundwater is to be accomplished (i.e. summarize remedial action plan). Provide a brief narrative description including: technical justification, schedule for implementation, estimated time to attain NFA status, plus plans and specifications for the selected remedial action technology.

On November 16, 2022, nine (9) soil borings (SB01-SB05 & BKG02-BKG05) were advanced via hand auger at the former Peak 1 tank battery to confirm the absence of hydrocarbon impacts and assess COGCC Table 915-1 metals in native material. A single soil boring (SB01) was advanced via hand auger adjacent to the former produced water vessel (PWV) excavation soil sample SS07 to confirm the absence of hydrocarbon impacts. A single soil sample was collected from the soil boring (SB01) at 5 feet bgs and submitted for the COGCC approved COC's. Analytical results indicated that all COCs were in compliance with the COGCC Protection of Groundwater SSLs. Four soil borings (SB02-SB05) were advanced below and adjacent to the former meter house excavation to confirm and delineate the vertical and horizontal extents of the cadmium exceedance observed in soil sample MH01-B. Three soil samples were collected from soil boring SB02 between 1 foot and 4 feet bgs, from soil adjacent to MH01-B. Additionally, two soil samples were collected from each of the surrounding soil borings (SB03-SB05) located north, west, and south of the former excavation at 0.5 feet and 1 foot bgs. All soil samples were submitted for analysis of cadmium. Analytical results indicated cadmium concentrations for all soil samples collected were in compliance with COGCC Protection of Groundwater SSLs. Twenty (20) background soil samples (BKG02-BKG05) were collected between 1 foot & 10 feet bgs, and submitted for analysis of Table 915-1 metals. Analytical results indicated that arsenic, barium, and selenium were in exceedance of the applicable Table 915-1 standards in native soil. Based on the analytical results, the arsenic and barium exceedances recorded in the source soil sample (SS01) were indicative of native soil conditions as referenced in footnote 11 of the Table 915-1. The soil boring locations are illustrated on Figure 2.

Soil Remediation Summary

In Situ

Ex Situ

- _____ Bioremediation (or enhanced bioremediation)
- _____ Chemical oxidation
- _____ Air sparge / Soil vapor extraction
- _____ Natural Attenuation
- _____ Other _____

- Yes _____ Excavate and offsite disposal
- _____ If Yes: Estimated Volume (Cubic Yards) _____ 98
- _____ Name of Licensed Disposal Facility or COGCC Facility ID # _____
- _____ Excavate and onsite remediation
- _____ Land Treatment
- _____ Bioremediation (or enhanced bioremediation)
- _____ Chemical oxidation
- _____ Other _____

Groundwater Remediation Summary

- _____ Bioremediation (or enhanced bioremediation)
- _____ Chemical oxidation
- _____ Air sparge / Soil vapor extraction
- _____ Natural Attenuation
- _____ Other _____

GROUNDWATER MONITORING

If groundwater has been impacted, describe proposed monitoring plan, including # of wells or sample points, monitoring schedule, analytical methods, points of compliance. Attach a groundwater monitoring location diagram.

Groundwater was not encountered during decommissioning or supplemental site investigation activities, at the Peak 1 tank battery.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

Quarterly Semi-Annually Annually Other

Request Alternative Reporting Schedule:

Semi-Annually Annually Other

Rule 913.e:

After initial approval of a Form 27, the Operator will provide quarterly update reports in a Supplemental Form 27 to document progress of site investigation and remediation, unless an alternative reporting schedule has been requested by the Operator and approved by the Director. The Director may request a more frequent reporting schedule based on site-specific conditions.

Report Type: Groundwater Monitoring Land Treatment Progress Report O&M Report
 Other

Adequacy of Operator's General Liability Insurance and Financial Assurance

Describe the adequacy of the Operator's general liability insurance and Financial Assurance to fully address the anticipated costs of Remediation, including the estimated remaining cost for this project (below).

If this information has been provided on a Form 27 within the last 12 months, provide the Document Number of that form.

Operator does not have site-specific financial assurance for this project; however, Operator has inactive well, blanket, and surface bonding including Surety IDs 106077122, 106473808, and 106473820, as well as commercial general liability and/or umbrella/excess insurance meeting the requirements of Rule 705.b. Operator does not anticipate making an insurance claim for this project.

- Source mass removal has been completed.
- Investigation and delineation of organic compounds in soil has been completed.
- Investigation and delineation for selenium is on-going for soil.
- Facility and infrastructure were decommissioned and the location will be reclaimed in accordance with the COGCC 1000 Series.

Costs included herein are estimates only and may change over time based on numerous factors. Accordingly, Operator makes no guarantees as to the accuracy of such cost estimates, thus providing an estimate for the next year below.

Operator anticipates the remaining cost for this project to be: \$ 15000

WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? Yes

Describe beneficial use, if any, of E&P Waste derived from this remediation project:

Volume of E&P Waste (solid) in cubic yards 98

E&P waste (solid) description Hydrocarbon impacted soils

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: North Weld Waste Management Facility

Volume of E&P Waste (liquid) in barrels 0

E&P waste (liquid) description _____

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: _____

REMEDIATION COMPLETION REPORT

REMEDIATION COMPLETION SUMMARY

Is this a Final Closure Request for this Remediation Project? No

If YES:

Compliant with Rule 913.h.(1).

Compliant with Rule 913.h.(2).

Compliant with Rule 913.h.(3).

Do all soils meet Table 915-1 standards? _____

Does the previous reply indicate consideration of background concentrations? _____

Does Groundwater meet Table 915-1 standards? _____

Is additional groundwater monitoring to be conducted? _____

Operator shall comply with the COGCC 1000-Series Reclamation Requirements for all impacted and disturbed areas.

RECLAMATION PLAN

RECLAMATION PLANNING

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing.

Following tank battery decommissioning activities, the location was backfilled, compacted, and re-contoured to match pre-existing conditions. The location will be reclaimed in accordance with the COGCC 1000 series.

Is the described reclamation complete? Yes _____

Does the reclamation described herein constitute interim or final reclamation of the Oil and Gas Location?

Interim Final

Did the Surface Owner provide the seed mix? _____

If YES, does the seed mix comply with local soil conservation district recommendations? _____

Did the local soil conservation district provide the seed mix? _____

SITE RECLAMATION DATES

Proposed date of commencement of Reclamation. 03/09/2022

Proposed date of completion of Reclamation. 03/30/2028

IMPLEMENTATION SCHEDULE

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

PRIOR DATES

Date of Surface Owner notification/consultation, if required. 09/20/2021

Actual Spill or Release date, or date of discovery. 03/09/2022

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 12/29/2021

Proposed site investigation commencement. 04/01/2023

Proposed completion of site investigation. 06/30/2023

REMEDIAL ACTION DATES

Proposed start date of Remediation. 03/09/2022

Proposed date of completion of Remediation. 03/30/2028

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

Change from approved implementation schedule per Rule 913.d.(2).

Basis for change in implementation schedule:

Implementation schedule change due to necessity to conduct a supplemental site investigation in native material.

OPERATOR COMMENT

On November 16, 2022, nine (9) soil borings (SB01-SB05 & BKG02-BKG05) were advanced via hand auger at the former Peak 1 tank battery to confirm the absence of hydrocarbon impacts and assess COGCC Table 915-1 metals in native material. A single soil sample was collected from the soil boring (SB01) adjacent for former excavation soil sample SS07 at 5 feet bgs and submitted for the COGCC approved COC's. Analytical results indicated that all COCs were in compliance with the COGCC Protection of Groundwater SSLs.

Nine (9) soil samples were collected from 4 soil borings (SB02-SB05) that were advanced below and adjacent to the former meter house excavation to confirm and delineate the vertical and horizontal extents of the cadmium exceedance observed in soil sample MH01-B. Analytical results indicated cadmium concentrations for all soil samples collected were in compliance with COGCC Protection of Groundwater SSLs. Based on these results the cadmium exceedance observed in MH01-B @ 1' bgs (0.608 mg/kg) was a discrete location and native soil below and adjacent to the former meter house excavation location was in compliance with COGCC Table 915-1 standards.

Additionally, twenty (20) background soil samples (BKG02-BKG05) were collected between 1 foot & 10 feet bgs, and submitted for analysis of Table 915 -1 metals. Analytical results indicated that arsenic, barium, and selenium were in exceedance of the applicable Table 915-1 standards in native soil. Based on the analytical results, the arsenic and barium exceedances recorded in the source soil sample (SS01) were indicative of native soil conditions as referenced in footnote 11 of the Table 915-1.

The selenium exceedance in the source soil sample (SS01) remains above COGCC Protection of Groundwater SSLs and above the observed background concentrations. Additionally, following the receipt of the additional background selenium analytical results and data evaluation, selenium concentrations observed adjacent to the meter-house and separator exceed average background concentrations. In accordance to correspondence with the COGCC Environmental Protection Specialist, up to three (3) additional background soil borings will be advanced to approximately 10 feet bgs in native material adjacent to the former tank battery location to further evaluate selenium concentrations in native soils. The supplemental site investigation will be completed pending landowner approval and the approval of this form.

I hereby certify all statements made in this form are to the best of my knowledge true, correct, and complete.

Signed: Karen Olson

Title: Senior Program Manager

Submit Date: 03/30/2023

Email: taspillremediationcontractor@pdce.com

Based on the information provided herein, this Application for Site Investigation and Remediation Workplan complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: RICK ALLISON

Date: 03/31/2023

Remediation Project Number: 21320

COA Type

Description

0 COA	
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Attachment Check List

Upon approval, the approved Form 27 and all listed attachments will be indexed to the Remediation Project file. Only the approved Form 27 will also be indexed to the related Facilities.

Att Doc Num	Name
403247109	FORM 27-SUPPLEMENTAL-SUBMITTED
403254747	LOGS
403360501	SOIL SAMPLE LOCATION MAP
403360943	ANALYTICAL RESULTS

Total Attach: 4 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)